# Python Turtle

Week 4

# Turtle

Python comes with its own drawing feature, named Turtle.

Turtle

- Has its own drawing area
- Has is own set of commands
- Needs to be imported from its library

# Import Turtle

Create a new Python file, save it as

`draw_square.py`

Add the following first line

```
from turtle import *
```

This imports the Turtle features into your program

If you run this program, nothing will happen.

# Draw a line

Add the following line

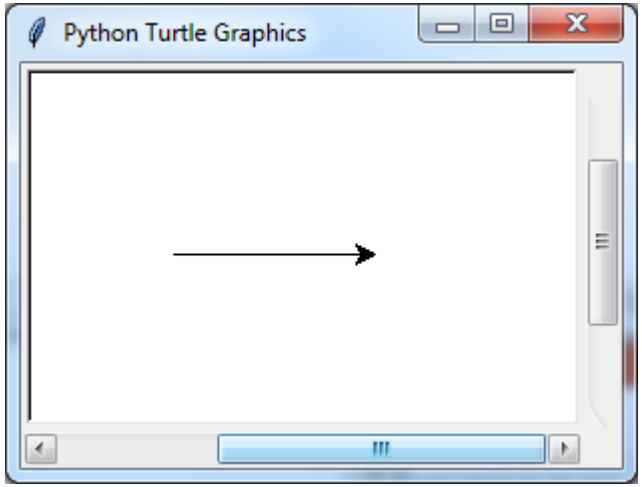
```
forward(100)
```

Run the program

# Draw a line

When you run the previous program:

- The Turtle canvas opens
- You see this.




The starting position for Turtle is:

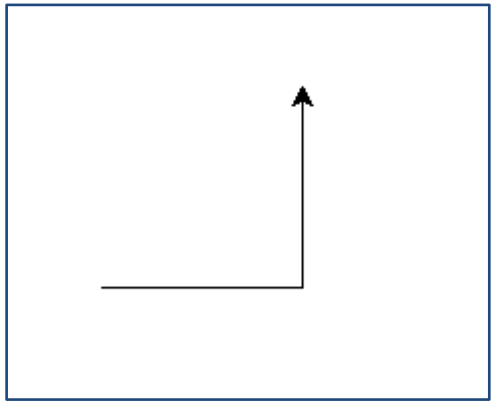
- The centre of the canvas
- Facing right (the direction of the arrow)

The `forward(100)` command moves the Turtle 100 pixels forward.

# Turn the Turtle

Add the following lines of code

```
left(90)
forward(100)
```



This does the following:

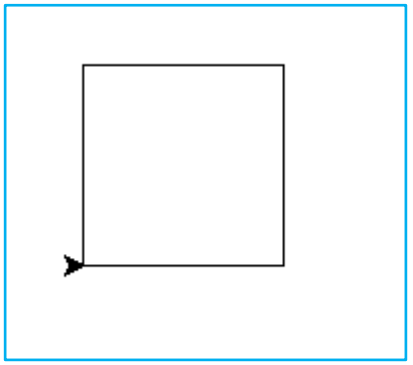
- Turns the Turtle 90 degrees to the left (now facing up)
- Advances the Turtle 100 pixels

Can you draw a square with Turtle?
Try it now.

# Draw a Square

Your code should look like this:

```
forward(100)
left(90)
forward(100)
left(90)
forward(100)
left(90)
forward(100)
left(90)
```



A much more compact version is:

```
for i in range(4):
    forward(100)
    left(90)
```

# draw_shape.py

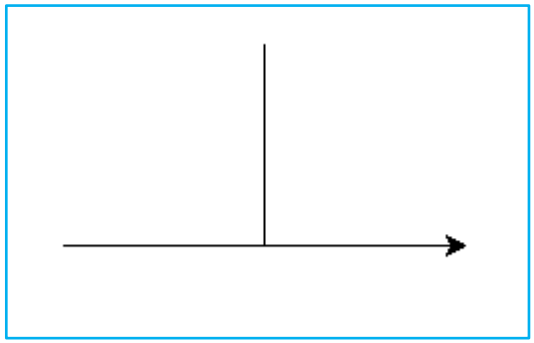
Create a new Python file, save it as

`draw_shape.py`

Don't forget to import turtle

# Move the Turtle Back

Try to draw this



To move the Turtle backwards, use

```
back(100)
```

This code works

- `forward(100)`
- `left(90)`
- `forward(100)`
- `back(100)`
- `right(90)`
- `forward(100)`

# draw_boxes.py

Create a new Python file, save it as

`draw_boxes.py`

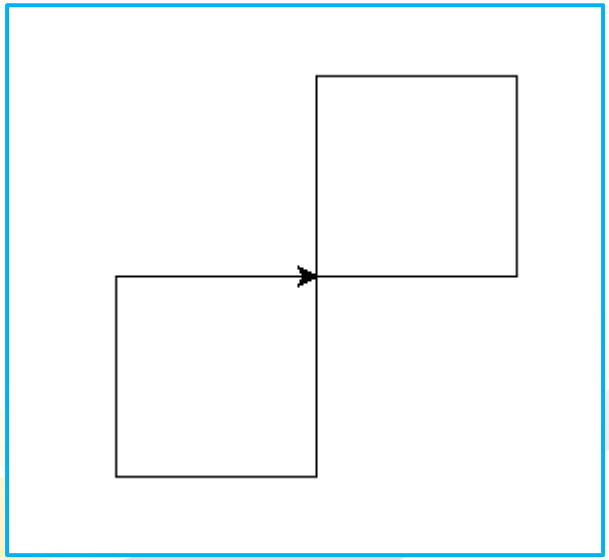
Don't forget to import turtle

# Turning the Turtle

Turtle has two commands to turn the Turtle:

```
left(degrees)
right(degrees)
```

Can you use the forward, left and right commands to draw this?



# Possible Solution

```
from turtle import *

forward(100)
for i in range(3):
    left(90)
    forward(100)
forward(100)
for i in range(3):
    right(90)
    forward(100)
```

This is not the only solution (or even the best).

# draw_two_lines.py

Create a new Python file, save it as

`draw_two_lines.py`

Don't forget to import turtle

# Move Without Drawing

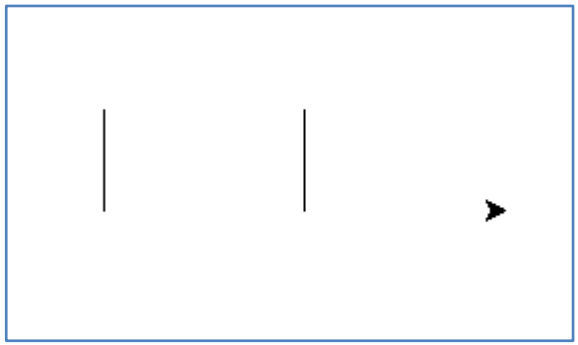
To stop the Turtle from drawing use

```
penup()
```

To resume drawing use

```
pendown()
```

Can you draw this?



This code will work:

```
for i in range(2):
    left(90)
    forward(50)
    back(50)
    right(90)
    penup()
    forward(100)
    pendown()
```

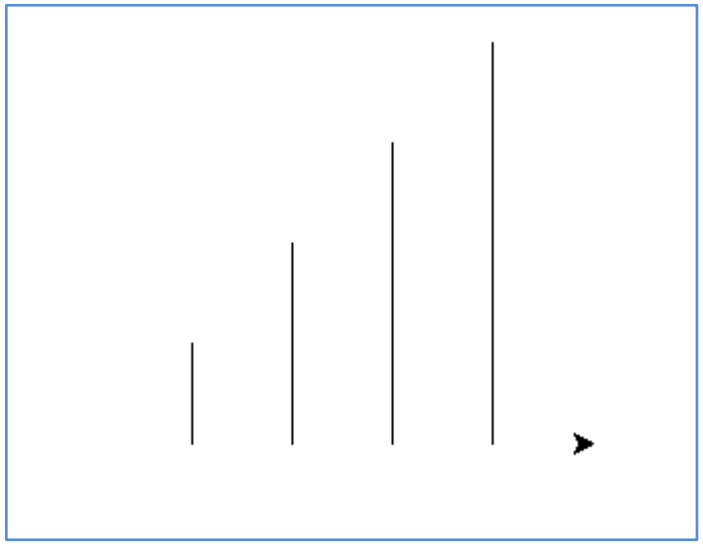
# draw_lines.py

Create a new Python file, save it as

`draw_lines.py`

Don't forget to import turtle

# Now try to draw this



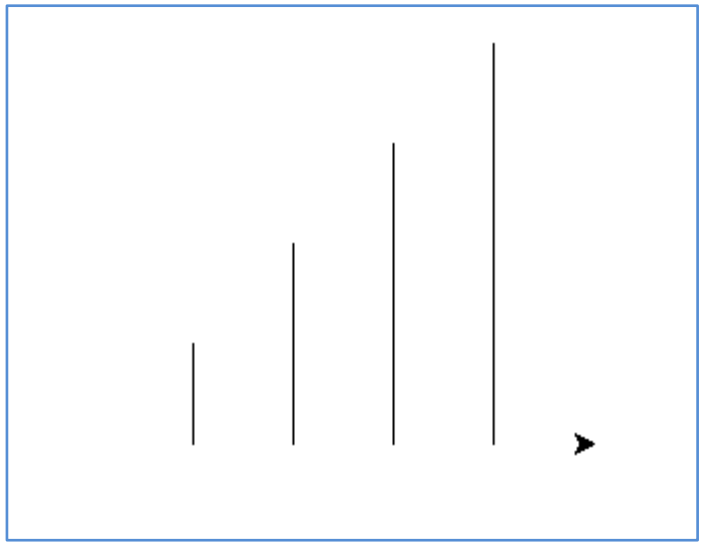
## Notes

- The heights are 50, 100, 150, and 200 (increments of 50)
- The lines are 50 pixels apart

## Hints

- Make a variable called length and set to 0.
- Add 50 to height.
- Draw the first line and move the cursor
- Make a loop.

# Possible Solution



```
from turtle import *

length=0
for i in range(4):
    length+=50
    left(90)
    forward(length)
    back(length)
    right(90)
    penup()
    forward(50)
    pendown()
```

## Note

This is not the only solution or even the best one.

# Review – Turtle Functions

**Basic Turtle Functions (covered in this lecture)**

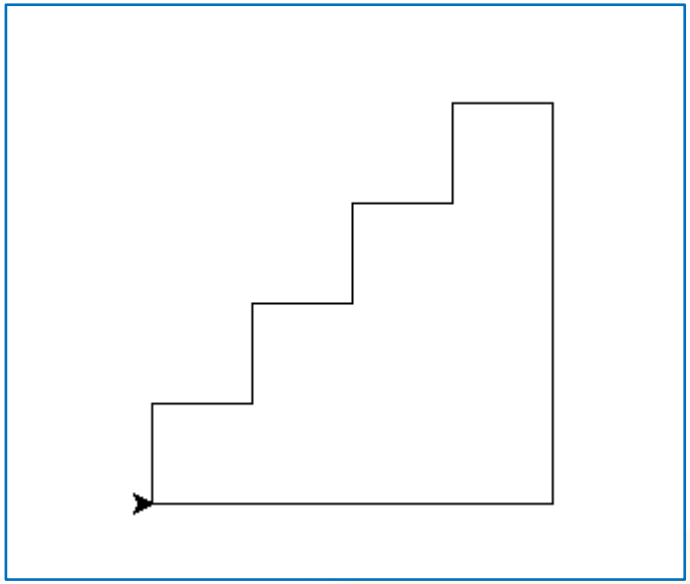
- forward(x) Moves the Turtle forward x pixels
- back(x) Moves the Turtle back x pixels
- left(n) Turns the Turtle left n degrees
- right(n) Turns the Turtle right n degrees
- penup() stops the Turtle from drawing
- pendown() starts the Turtle drawing (again)

**More Basic Turtle Functions (in tutorial next week)**

- setpos(x,y) Moves the Turtle to (x,y)
- home() Moves the Turtle to (0,0)
- pencolor('red') Sets the drawing colour to red
- fillcolor('yellow') Sets the fill colour to yellow
- begin_fill() Starts filling the spaces in drawing
- end_fill() Stops filling the spaces

# Practice Exercise

- Can you make Turtle draw this?



## Advanced

- Set a variable step_height
- Set a variable num_steps
- Use a loop
- Draw any number of steps of any height